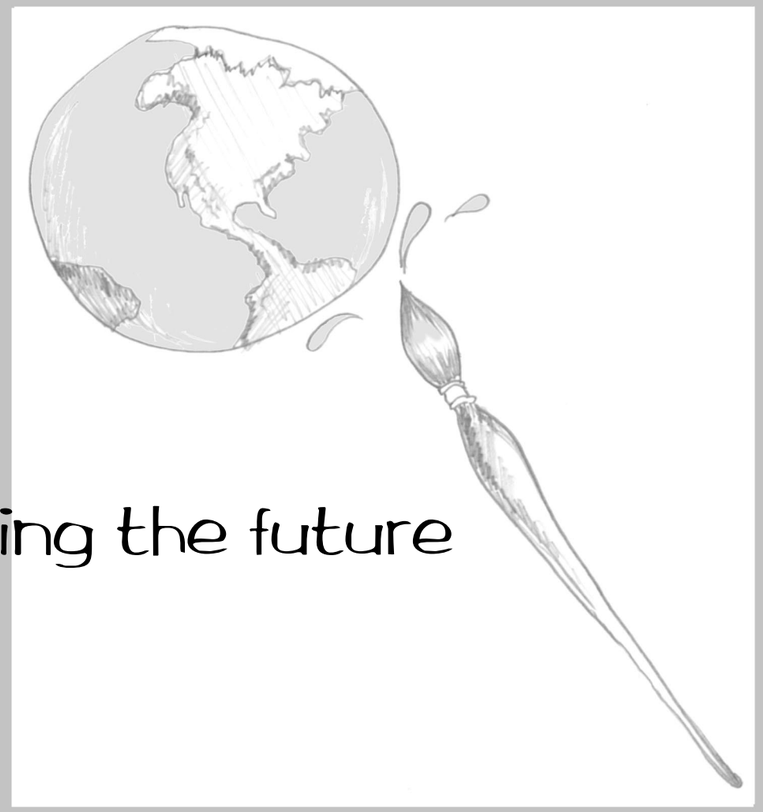

creating the future

Since the beginning of time, humans have pondered the future. An innate sense of curiosity creates a wonderment about things yet to come. There are those that revel in others' discoveries—findings that reveal the answers to questions contemplated for years and even centuries.

The Marshall Space Flight Center's reputation is built on a foundation of accomplishments through great strides in research and technology. Marshall houses some of the most talented forward-thinking minds in our country, and it is that talent—combined with a determination to find answers to the questions others only ask—that helps foster the bond between NASA and the American public.

Marshall's capabilities are spread over several areas of research and technology. We are the NASA Lead for Space Transportation Systems Development and Microgravity Research; a NASA Center of Excellence for Space Propulsion; and the Lead for Space Optics Fabrication, Metrology and Testing. MSFC's special areas of expertise allow an intensified focus of effort, thereby allowing us to yield products of unsurpassed quality and ingenuity.

Through the advancement of cutting-edge technology, Marshall maintains its position as the world's leader in Space Transportation Systems Development—one of our primary missions. In this role, Marshall is responsible for the necessary research, technology development, design and integration of space transportation and propulsion systems to take us into the 21st Century. For example, the development of revolutionary reusable launch vehicles, such as the X–33 and X–34, will lead to an economical, safe, and robust launch system to meet the growing needs of placing a diverse range of payloads into orbit. This reusable launch vehicle technology falls under the proud tutelage of the Marshall Center and will significantly reduce the cost of sending people and cargo into space.

With the same determination and vision that put us into space for the very first time, Marshall is facilitating the use of space for the development of commercial products and services. With access to microgravity, the research community is free to study biotechnology, combustion, fluids, fundamental physics, and materials processes and phenomena. An example of research in microgravity is that of protein crystal growth. By growing purer crystals of disease proteins in space, scientists are better able to discern the formation of the crystals, thereby making possible the design of more effective drugs to fight illness and disease here on Earth. The knowledge provided by space-based research also allows researchers to develop stronger metals and alloys, produce materials that conduct electricity better, increase fuel efficiency, improve pollution control, and validate basic theories, to name a few.

As a NASA Center of Excellence for Space Propulsion, Marshall provides innovative and cost-comparative systems for future access to space. Among our highest priorities are reusable advanced space transportation technology with substantial work in performing technology demonstrations of advanced thermal protection systems, structures, and avionics systems. We are also responsible for developing technologies for high-efficiency, low-cost upper stages, including solar thermal stages, and we reside at the forefront of launch concept definition and architecture studies such as single-stage-to-orbit, two-stage-to-orbit, vertical takeoff, and horizontal landing and takeoff options using air-augmented and rocket-only propulsion. These technological advancements, along with responsibilities that include the Space Shuttle main engines, solid rocket boosters, and the external tank, help us shorten the span between where we are and what lies ahead in the vast mystery of our universe.

As a lead for developing space optics manufacturing technologies, our objective is to provide key enabling contributions to the Agency's future programs. In performing this role, we will make maximum use of existing resources throughout NASA, other government agencies, industry and academia. We will establish government, industrial and academic consortia which will provide the means for developing and maintaining facilities and equipment critical to the development of the technologies required for NASA's missions in the 21st century. Providing access to these facilities and equipment will serve to augment scarce resources for technology development throughout government, industry and academia, thereby ensuring that our country maintains its pre-eminence in the world scientific community.

Many future missions will require highly sophisticated optical systems. This is especially true in the area of astrophysics, but also holds true for planetary detection, cosmic-ray detection, solar physics, and Earth science remote sensing. Consequently, it is anticipated that early in the next decade, the Agency will be prepared to initiate the development of missions that will require large, lightweight telescopes observing at all wavelengths from gamma ray through infrared. If the scientific requirements are to be met for these missions, it is essential that the United States have the skills and facilities required to produce these telescopes. Therefore, one of the primary objectives of the Marshall optics program is to identify and develop technologies and capabilities required for future missions and to develop and implement plans to overcome any deficiencies.

At the Marshall Center, the future is bright with promise, and we know that it will be what we make it. So we look ahead, using the legacy of our rich and successful past as a guide, plotting a course that will take us to the next Millennium and beyond.